MECHANICS, PHYSICS, AND CHEMISTRY.

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Description of Apparatus for Removing and Replacing the Wheels of Locomotives and Cars. Invented by JOHN FOUSER of Philadelphia. By H. HOWSON, Civ. Eng.

One of the greatest inconveniences attending the repairing of locomotive engines and cars, is the fact, that those parts which through wear and tear are most liable to get out of order, are the most difficult of access.

The continual necessity of examining and renewing the axles and bearings as they become worn or otherwise deteriorated, forms no small item in the expenditures of railroad companies, and the preparatory and tedious process of removing the axles, in addition to the material and workmanship, conduces to render such repairs most costly.

This will be apparent when we recollect, that to remove and replace the wheels and axles of an ordinary eight-wheeled locomotive by the use of common screw-jacks is, at a moderate calculation, the combined work of four men for ten hours.

It is true, that in some instances the use of ponderous cranes for raising the entire superstructure from the axles has been resorted to, and on some of the lines in France, extensive and complicated arrangements of movable platforms, operated by racks and gearing, have been brought into practice to effect the required removal.

Throughout the numerous railways in this country, however, the old fashioned screw-jack is still the favorite implement for effecting the abovementioned purposes; and it is somewhat singular, that an instrument so slow in its operations and tedious to manage, has not, ere this, been replaced by more rapid and tractable appliances.

The annexed engraving (Plate IV,) represents two views of Mr. Fouser's apparatus for removing and replacing the wheels and axles of locomotives and cars.

The inventor is a practical machinist, and his experience both in the workshop and on railroads, has shown him the many difficulties attending the repairing of locomotives, and has induced him to design a simple and efficacious arrangement, by which the most important of these difficulties may be overcome.

Measures have been taken to secure the invention by patents, both in this country and abroad, and active preparations are being made to bring it into actual operation.

Fig. 1, in the engraving, represents a longitudinal section of the apparatus in question, showing the truck and driving wheels as in the act of being removed.

Fig. 2, is a transverse section of the same.

A is a pit in a line with the rails of a track in a locomotive repairing shop; in some cases it may be situated on the main line. B is a platform with longitudinal rails corresponding in width of gauge with those of the adjacent track. The platform is nearly of the same size as the pit, sufficient spaces being left between the sides of the pit and edges of the

platform to allow the latter to be raised and lowered within the former, without coming in contact.

Underneath the platform are strong cross pieces or beams, C, the ends of which project into recesses D, left in the sides of the pit. E are cast iron columns on the edge of the pit, and secured to the masonry or brick-work immediately above the recesses, D. Through these columns pass the screws F, which are connected to the ends of the cross-pieces, C, by means of the jointed rods G. H are the nuts, which have flanches at their lower ends, confined by means of caps within the tops of the columns in such a manner that the nuts may turn freely without the possibility of moving vertically. To the nuts H, and above the columns, are screwed the worm-wheels J, and gearing into these are the worms, K, on the horizontal shafts M, which have their bearings on brackets, L, secured to projections on the columns.

To the masonry on each side of the pit and between the columns, are secured the plates N, having flanches, which confine laterally the adjustable blocks, O and P. Both these blocks are arranged so as to be easily moved backwards and forwards and rendered stationary at the position required, by ordinary bolts.

It will be observed that the blocks, O, have three sets of bearings, into either of which may be placed the pins which form the fulcrums of the levers Q, the long arms of the latter being connected to the sliding blocks P, by means of the adjustable rods R.

S S are flanched rollers hung on brackets secured to the sides of the cross-pieces C, and bearing against the rails T, on the sides of the pit, so as to serve as guides for the platform when in the act of being raised or lowered.

Previous to the apparatus being brought into operation, the platform is raised to a level with the ground, so that the rails on the platform and track correspond. Should it be necessary to remove the driving wheels only, that portion of the locomotive to which they are attached, is moved over the platform, the other portion remaining on the permanent track.

The levers Q are now adjusted, so that the points may bear against the under edge of the fire-box, as shown in Fig. 2, or under some portion of the frame-work, and the axles being disconnected, the platform is lowered, and with it the wheels and axles, by turning the shafts M. When sufficiently low, the wheels are rolled to the end of the platform, and clear of the engine, when they are again raised by turning the shafts, M, in a contrary direction, until they are again on a level with the permanent track, along which they may be moved to any distance required. A supplementary truck may now be placed under the fire-box and the engine removed away altogether, or placed above the platform, so that the other wheels may be removed. It is the intention of the inventor, however, in central localities, to make the pit and platform so much longer than the locomotive, that the whole of the wheels may be removed at one raising and lowering of the platform.

It will be seen, that the levers Q can, through the sliding boxes P and Q, and adjusting screw R, be regulated to suit almost any difference which may occur in the construction of the engines.

It is occasionally requisite in replacing the wheels and axles, that one

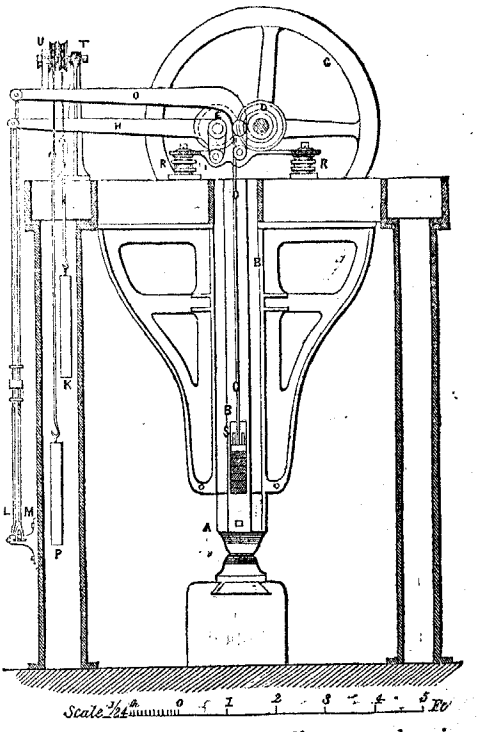
wheel should be raised higher than the other. By Fouser's apparatus, this can be easily done by turning one of the shafts, M, while the other remains stationary ; thus giving an inclination to the platform, which, on account of the jointed rods G, in no way affects the proper working of the screws F.

In repairing shops, power may easily be applied to the shafts M, by straps passing upwards and crossed overhead so as to clear the chimney.

By the use of his contrivance, the inventor calculates to be able to remove the wheels and axles of an eight-wheeled locomotive in less than an hour, two men only being required to assist in the operation.

On an Improved Friction Hammer. By JAMES KITSON, Leeds.*

The hammer represented in our engraving has been in use for some time at the author's works, Leeds, where it was originally constructed as a simple and inexpensive hammer, for the heavier smiths' work; and the present description has been prepared only in compliance to a request to communicate to the Institution the particulars of this hammer, as possessing some practical advantages of efficiency and simplicity.



The hammer block A, weighing 5 cwt., is guided by grooves in the same, BB, and is lifted by the flat wrought iron friction bar CC, 5½ inches wide, and ⅝-inch thick, fixed into it by a T head, with two cutters, SS.

The friction bar C, is raised by two rollers D and E, carried on the cross frame at top, one of which D, runs loose on its axle, and the other E, is fixed on a shaft which is driven continuously by a pulley, and carries a fly-wheel GG, at each end, to give momentum for lifting the hammer.

The axle of the roller D, is carried by a bent lever H, which works on a fixed centre I, below the roller, and has a chain connected to the outer end, passing over a pulley T, and attached to the weight K. This weight presses the tightening roller D, towards the driving roller E, and grips the friction bar C, between them, causing the hammer to be drawn up

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